

PERFORMANCE AUDIT
Of the Management of Capital Projects by the Department of
Transportation Services

Report 2001-1
April 2001



PERFORMANCE AUDIT HIGHLIGHTS

April 2001

Management of Capital Projects by the Department of Transportation Services

Introduction

The Department of Transportation Services is established by City charter to operate transportation systems, including transit and traffic control systems. At the end of FY 2000, the department reported 19 ongoing capital projects under its management budgeted at \$51 million.

The objectives of this in-house audit by the Office of Council Services were to assess the management of capital projects by the Department of Transportation Services, and to develop recommendations to address any weaknesses identified. Due to time limitations, we were not able to review the Traffic Engineering division.

Findings

There Are No Official Written Policies and Procedures To Manage Capital Projects.

- C The Department's project management policies have not been finalized so most managers rely on experience and on-the-job training.
- C Result: the Department cannot ensure that its projects are managed, documented, and evaluated in a consistent manner.

Project Files are Incomplete and Noncompliant with Federal, State, and the Department's Own Document Retention Requirements.

- C Key project documents were missing. Files for earlier project phases were discarded or destroyed by termites.
- C Result: the City risks incurring sanctions from the federal government.

Capital Projects Are Not Evaluated.

- C There is no evaluation of capital projects after they are completed or become operational.
- C Result: the effectiveness of the computerized traffic signals cannot be determined, and more articulated buses are being ordered despite serious problems being identified.

Project Status Reports to the Council are Sometimes Not Issued and Are Not Meaningful.

- C Two of the last four calendar year-end reports have not been issued. The information provided on project status is confusing, and key events are not being disclosed.
- C Result: the Council is not receiving meaningful information about the progress of projects it funds.

The Lack of an Approved Operations Plan for the Department's Computerized Traffic Control System Project Has Halted Federal Funding for the Project.

- C The Department has been unable to obtain federal approval for its operations plan.
- C Result: federal funding for the system has been halted, but the Department is proceeding with a significantly scaled back project that risks cost overruns and may not meet program requirements.

Budget Projections for Large Capital Projects Have Been Unreliable.

- C The Department has been unable to reasonably anticipate its budget needs.
- C Result: this reflects poor budget planning and presents an obstacle to establishing a set schedule for routine bus replacement.

Agency Response

In its written response, the Department agreed with nearly all of our recommendations but disagreed with many of the findings. For example, the Department responded that it follows certain federal, state, and departmental policies, but we found those policies do not directly address project management. The Department stated that it informed the auditors of separate project files and working files. We did not receive such information. The Department stated that the articulated bus manufacturer promptly rectified all of the problems and there was no impact on fleet maintenance or availability. We obtained correspondence and interviewed officials from Oahu Transit Services (OTS) that indicated otherwise. The Department stated that the number of buses procured may change due to the Council's appropriation of funds, but for the years reviewed, we found the Council approved the amounts requested. The Department commented that it was favorably reviewed in the most recent Federal Transit Authority Triennial Review, but we found that review to be an evaluation of compliance with certain federal regulations, not an audit of project management. Finally, the Department contended that the projects reviewed do not have a major impact on the bus rapid transit project. We disagree.

I. Introduction

This audit of the Department of Transportation Services' management of capital projects was initiated by the Office of Council Services' Audit Section as part of its ongoing program to audit various City programs and services on a rotating basis. It is the intent of the Audit Section to include capital project management programs of the City in the audit rotation schedule due to the large amount of expenditures involved, the visibility of capital projects, and the significant impact such projects have on City residents. Limiting the scope of the audit to the management of capital projects made it suitable for an in-house audit.

A. Objectives

The objectives of this audit were to assess the adequacy of the management policies and procedures pertaining to the development of capital projects by the Department of Transportation Services, and to develop recommendations to address any weaknesses identified. The assessment was based on the effectiveness of policies and procedures in achieving the following:

- (1) Keeping projects on time and on budget;
- (2) Ensuring that completed projects meet their quality or performance objectives;
- (3) Organizing project staff and the project development process effectively; and
- (4) Keeping the Council informed about the status of ongoing projects.

B. Scope

In this audit, the capital project management policies and procedures of the department as a whole were reviewed, including those three of its four divisions: Public Transit,

Traffic Signals and Technology, and Transportation Planning. We reviewed the management of one project in detail from each of those divisions over the past three fiscal years 1998, 1999, and 2000.

Due to the unexpected amount of time we found necessary to conduct the audit and the interest in issuing the report in a timely manner, the Traffic Engineering division was not reviewed in this audit.

Fieldwork was conducted from April 2000 to January 2001.

C. Methodology

Interviews were conducted with departmental staff; Oahu Transit Services (which operates the City's bus system under contract); contracted firms and consultants involved in the department's capital projects; budget and contracts staff in the Department of Budget and Fiscal Services; the City's records management section; Hawaii Department of Transportation; the transit authorities of Seattle, Washington (King County Metro Transit), and Houston, Texas (Harris County Metropolitan Transit Authority); the Bus Research and Testing Program of Pennsylvania State University; and Federal Highway Administration. Internal documents relating to the development of current and recent capital projects were reviewed. Documents transmitted to the Council concerning the capital projects were also examined.

II. Background

A. Current Agency Profile

The Department of Transportation Services is established by City charter to, among other things, plan, operate and maintain transportation systems, including transit systems, and to locate, select, install, and maintain traffic control facilities. The department is organized into four divisions: Public Transit, which operates the bus system; Traffic Engineering, which is responsible for road standards, signs, striping, traffic safety programs, and bikeways; Traffic Signals and Technology, whose responsibility includes traffic cameras; and Transportation Planning, which conducts federally required planning activities and monitors federal transportation grant programs. In its operating budget for FY 2001, the department accounted for 104 positions and \$120 million in spending, of which \$114 million is for the bus and HandiVan systems, which are run under contract by Oahu Transit Services, Inc., a private operator.

In 1998, the Mayor conducted a sweeping reorganization of City government. Among other things, many capital improvement functions were centralized in a new Department of Design and Construction. This meant the responsibility to complete certain transportation-related projects, such as the design and construction of roads, traffic intersection improvements, street lights, and bikeways, was now assigned to the new department. Still, the Department of Transportation Services retained the responsibility for bus-related capital projects, computerized traffic control systems, and overall transportation planning studies. Such projects represented \$21.6 million in the department's FY 2001 capital budget. At the end of FY 2000, the department reported 19 ongoing capital projects under its management budgeted at \$68 million.

B. Prior Council Audits

The Department was last audited by the City Council in 1981. That audit, *Report on Performance Audit of Department of Transportation Services and MTL, Inc.*, by Deloitte Haskins and Sells, focused on the contracting of the City's former bus operator, MTL. Among the audit's findings that related to capital project management were that the bus operator had little input into vehicle purchase decisions, that facility planning had been neglected, and that the Department and the bus operator needed to work more closely on planning, operating, and capital decisions. The audit noted that articulated buses were being considered for Honolulu's fleet, but that the cost benefit of such buses had not been evaluated.

The Department commissioned its own study in 1987 with Coopers and Lybrand, *Special Management Review of the City and County of Honolulu Bus System*. The Council then authorized a follow up of that audit by Coopers and Lybrand in 1989, *Previous Study Update of the City and County of Honolulu Bus System*. Both the 1987 review and the 1989 update focused primarily on operational issues, but included among their findings that the bus fleet needed to standardize on fewer bus models.

C. Projects Reviewed

In addition to reviewing the department's management of capital projects as a whole, we selected one capital project from three of its divisions to examine in further detail. Due to time limitations, the Traffic Engineering division was not reviewed. These projects were selected because they were deemed representative of the capital projects managed by the division. In some cases, the project is annually included in the capital budget, and the project label represents various years' appropriations which were made under the project's overall description. In those cases, we primarily reviewed those years for which implementation of the budgeted project was

underway but not yet been completed. A synopsis of each selected project follows.

1. Bus Acquisition Program -- Public Transit Division.

Under this annually budgeted project, buses and also non-revenue vehicles are purchased to maintain and, occasionally, to expand the City's bus fleet. Vehicles for the HandiVan service are acquired under a different capital project.

From FY 1998 to 2000, the Department procured 30 low-floor articulated buses to initiate the City's new CityExpress and CountryExpress routes, and 34 standard replacement buses amounting to \$13.7 million and \$9.8 million, respectively.

2. Primary Corridor Transportation System Study -- Transportation Planning Division.

Under this project, a study was conducted to develop a new transit system for the City. From FY 1998 to 2000, this project encompassed the development and completion of a draft Environmental Impact Statement (DEIS) and Major Investment Study report at a cost of \$8.2 million. This was to lead to the preparation of a final EIS, which, as with the DEIS, was to be submitted to the Federal Transit Authority. To date, over \$15 million has been budgeted for the project.

3. Computerized Traffic Control System -- Traffic Signals & Technology Division.

Under this project, cameras and traffic signal control devices at various intersections are linked to a City traffic control center via fiber optic cables, and traffic signals are synchronized by computers to improve traffic flow. With live video coverage of selected intersections, technicians at the control center can change traffic signal

timing to respond to accidents, road construction, and other traffic problems. Appropriations for the project first began in FY 1985, and to date, over \$27 million has been budgeted for studies, equipment, wiring, and buildings. This audit focused on appropriations for FY 1998 for \$4.5 million, which was to expand the coverage of traffic cameras and computerized traffic signals.

III. Findings And Recommendations

We found serious weaknesses in the way the Department of Transportation Services manages its capital projects. There were no official written policies to guide project management, key project documents were missing from files, the Department failed to comply with federal, state, and the Department's own document retention and project file organization policies, projects were not evaluated either upon completion or after they were put into operation, the reports to the City Council on the status of the projects were inaccurate, and budget projections for the projects were unreliable. The deficiencies have already halted federal funding for one key project and puts the City at risk of incurring sanctions from the federal government.

All of the projects reviewed in this audit report have a major role to play in the bus rapid transit project. Consequently, we would recommend that the deficiencies in project management identified in this report be promptly addressed to avoid potential problems in the City's upcoming, billion-dollar bus rapid transit project.

Finding Number One:

There Are No Official Written Policies and Procedures to Manage Capital Projects.

C The Department's project management policies have not been finalized so most managers rely on experience and on-the-job training.

C Result: the Department cannot ensure that its projects are managed, documented, and evaluated in a consistent manner.

To promote effective project management, every agency involved in developing capital projects should have policies and procedures that establish the project managers' role, responsibilities, and authority for capital projects. The policies and procedures should also establish the management controls that help to ensure that projects are completed on time, within budget, and perform as intended.

Over the past year, the Department has been reviewing a draft set of policies and procedures that, in part, address project management issues. At this writing, the Department has not yet finalized them. Until the policies and procedures become final, the Department relies on the experience of its project managers and on-the-job training. The disadvantage of this approach is that project management controls and processes can be inconsistent and unreliable.

Some of the Department's Divisions follow policies and procedures to a limited extent that incorporate elements

of project management. For instance, the Transportation Planning Division's consultant contract for the Primary Corridor study required the consultant to prepare a project management plan. The Project Management Plan/Project Quality Control Plan defined the management and control procedures under which the consultant services were to be provided in the contract. Topics included the operating procedures between the Department and the consultant and subconsultants, the hierarchy of authority and responsibility, the roles of various individuals and their relationships in implementing and managing the work program. It also defined project assignments, deliverables, tasks, schedules, budget and cost controls, communication channels for reporting and review, and quality control procedures. We found the plan to be consistent with the Federal Transit Administration's capital project management recommendations regarding what can be done to ensure a project's completion within budget, on schedule and meeting performance expectations. However, without a departmental policy that addresses such issues, there is no reasonable assurance that such guidance will be applicable to the other projects of the Transportation Planning Division, let alone the remainder of the department.

In the Traffic Signals and Technology Division, the project manager reports that they rely on a manual of state and federal capital project requirements compiled by the State Department of Transportation Highways Division to manage projects. However, while the manual provides useful guidance, the requirements apply to federal-aid projects only, and some of the policies have not been updated in 30 years.

Without its own official policies and procedures that apply to all of its capital projects, the Department cannot ensure that its projects are managed, documented, and evaluated in a consistent manner. Without uniform policies on project management, the Department is unable to provide full accountability for its projects, is unable to

fully protect the City's interest should legal claims and funding disputes arise, and is unable to respond adequately to internal or external audits.

Recommendation:

We recommend that:

- C The Department finalize and adopt its draft policies and procedures for managing capital projects.
- C The Department ensure that the policies and procedures cover all of the management control issues described in this audit.
- C The Department ensure that the policies and procedures are followed by all divisions and project managers.

Finding Number Two:

Project Files Are Incomplete and Noncompliant with Federal, State, and the Department's Own Document Retention Requirements.

- C Key project documents were missing. Files for earlier project phases were discarded or destroyed by termites.**
- C Result: the City risks incurring sanctions by the federal government.**

Accurate and complete project files are needed to ensure consistent project management, and to protect the City's interests if disputes or claims arise. Documents and records are also necessary in many instances to retain continued federal funding for City transportation projects.

The Department has a records retention schedule which was approved by the Council in its original and amended form in Resolutions 85-306 and 88-263, respectively. The schedule specifies that the Department's general correspondence be held for 10 years, and engineering project documents be held for 10 years after project completion.

We found major gaps in the documents stored in the Department's files. Because most of the files were not indexed, it was difficult to determine what documents were originally in the files but may have been removed or lost. We could not determine if certain documents were ever prepared or kept. In case of a legal dispute with contractors or funding agencies, the incomplete and disorganized nature of the project files would hinder the defense of the City's interests.

Basic project documentation such as minutes of the Department's weekly progress meetings are important to record and justify significant contract decisions and events. While the Department's Public Transit Division was able to produce nearly all of its weekly progress meeting minutes, neither the Transportation Planning Division nor the Traffic Signals and Technology Division was able to provide such minutes even though those meetings were said to have occurred.

The Department represented to us that its project files were complete and that all project documents were in the files presented for review in this audit. If that were the case, it would be extremely difficult for a project to be effectively and efficiently managed based solely on the documents provided for review.

The Department's contracts for federal-aid projects include a requirement for project documents to be available for audit review. However, the Department has no policy of its own to ensure its project documents are organized, complete, and available to City auditors.

Documentation problems particular to the individual projects reviewed follows.

Computerized Traffic Control System

Projects receiving Federal Highway Administration (FHWA) funds such as the Computerized Traffic Control System (CTCS) must comply with requirements pertaining to project records.

First, the City must maintain accurate and complete project contract documents and records for all phases of a construction project for three years after the Federal Highway Administration completes its formal project close-out process. That is because as part of the federal close-out process, the City must be able to justify all project costs. To date, federal highways has closed out

Phase I of the project only, which occurred on August 19, 1991.

Second, the requirements provide specific guidance on record keeping relating to the need to maintain complete project documents, and to organize and index them. Indexing documents is a critical procedure; without an index, important documents could be lost, misplaced, or discarded.

(1) **Record Retention**

We found that the Department lacked project files or documents for CTCS Phases I, II, and III¹. The missing documents included the construction contracts and specifications. The division administrator reported that the project files for project Phases I, II, and III were discarded.

The Department of Budget and Fiscal Services (BFS) normally maintains its own copies of all contracts executed by the City. However, when we requested copies of the Phase I, II, and III contracts for this audit, BFS discovered that its copies of the Phase I, II, and III contracts were destroyed by termites. As a result, the City has no copies of the project contracts for these phases.

The lack of key documentation for Phases II and III which have not yet been closed by the federal government is contrary to federal and state requirements. More importantly, according to FHWA, it means the City is at risk of incurring federal sanctions. In the worst case, the City would have to reimburse the federal

government for the total cost of both phases, which is approximately \$7.8 million.

At the time of our initial file review in November 2000, the Department had no copy of the executed CTCS Phase IV contract in its files. When we reviewed CTCS project files maintained by the FHWA, however, we found a copy of the executed contract and the Department's final project reports for Phase IV. When we returned to the Department to confirm the absence of those documents, we found an executed copy of the Phase IV contract had been placed in the files.

The FHWA office files also contained correspondence recommending that the Department revise the specifications it used for the products and materials used in Phase V because the specified products and materials did not meet industry standards. These documents were missing from the Department's files.

(2) **Record Keeping**

We found that the project documentation for CTCS was not being maintained in accordance with FHWA record keeping requirements. The CTCS project files were not indexed. The files were also incomplete. Written weekly status memos and weekly capital project status spreadsheet information on the CTCS projects that the Department's staff said were used to monitor the projects were missing from project files.

Primary Corridor Transportation System Study

In April 2000, we were shown the location of the project files for the Primary Corridor study. Those files completely filled several file drawers. When we commenced our detailed file review in September 2000, one file drawer was empty and two others were only partially filled. We were told that "extraneous and duplicate information" had been removed, and that the report deliverables had been moved and stored elsewhere.

¹The Department has just embarked on Phase VI of the project. Unlike the other project documents, the "as-built" plans for Phases I to V of the project have been retained by the Department.

But we were also told that the remaining project files contained all contract documents and the project files in the file drawers were complete. We based our findings on these representations.

The Department's contract for the federally-funded Primary Corridor study required the consultant to document **all** communications and minutes in writing. However, neither the Department nor its consultant could produce more than a few records of those meetings. The Department had no documents that explained the need for any of the six contract amendments made for the Primary Corridor study, the need and justification for increasing the project's budget by \$614,500, or the need to extend the original contract completion date from June 3, 2000 to December 2000. In addition, there were no documents, memoranda, or meeting minutes regarding the development of project deliverables, or explaining why and when the Department decided to abandon work on the "Early Start" transportation projects that were originally in the contract scope, or why work on the Sand Island Scenic Parkway was added to the contract scope after the project began, and why it was later dropped. Neither the department nor its consultant had a copy of the letter notifying the consultant it was awarded the contract. Nor could they produce minutes of the meetings during which we were told the specific tasks and deliverables for the project scope of work for the Primary Corridor study were defined.

Bus Acquisition

In April 2000, we were told the project files for the acquisition of the articulated buses only consisted of the contract documents and two binders of project documents. When we then reviewed articulated bus project files at Oahu Transit Service, however, we found documents such as: (1) the master resolution list, which detailed features required in the new bus and documented DTS' and the manufacturer's agreement to delete from the contract the requirement that a prototype bus be produced (see Finding Number Three); (2) the daily availability status reports, which documented the operational status of the articulated buses; and (3) the articulated bus conditional acceptance forms, which listed 43 significant problems found throughout the fleet of articulated buses. These documents were not present in the Department's project files in April. When we returned to the Department to confirm the absence of those documents, a folder containing the conditional acceptance forms appeared in the files, and the Department produced the daily availability status reports.

The Department claimed it used a weekly capital project status spreadsheet to internally monitor the progress of capital projects. But when asked, it declined to produce copies of the spreadsheet. We were told that documents from the Public Transit Division's bus acquisition project correspondence files, project timetables, memorandums to and from Oahu Transit Services, minutes from its Quarterly Operations Review meetings with Oahu Transit Services, and other project management and internal reports were either missing or unavailable. We asked Oahu Transit Services staff for their copy of the Quarterly Operations Review report and meeting minutes, but they declined and informed us we would have to get the documents from the department. We believe those detailed documents would have shed more light on the status of the articulated buses and on bus replacement plans.

The absence or unavailability of key documents for the bus acquisition project raises serious concerns regarding whether the Department established reasonable management controls over the acquisition process.

Recommendation:

We recommend that:

- C The Department adopt and implement project document management and control practices for its capital projects. It should expedite the adoption of policies and procedures for its capital projects which should address the proper maintenance of project records. All project documents should be organized and stored in a single location. The documents in the files should be indexed to ensure the files are complete.
- C The Department review and update its records retention schedule last approved by the Council in Resolutions 85-306 and 88-263 to ensure the adopted schedule is up to date and applies to its current divisions following the 1998 departmental and citywide reorganization. It should also check that the schedule complies with applicable federal and state requirements.
- C The Department establish a procedure to ensure that contract documents and files for all federally funded projects are identified, filed, and retained in a systematic manner until they are no longer required for compliance with federal rules.
- C The Council enact an ordinance to require both City agencies and contractors with the City to retain project documents for a reasonable period after project completion, and that documents are available and accessible to City auditors.
- C With respect to the Computerized Traffic Control System projects, the Department promptly discuss with the Federal Highway Administration and report to the Council what steps the City needs to take to avoid sanctions by the federal government.
- C With respect to the Primary Corridor study, the Department take steps to ensure federal documentation requirements are met by both the Department and its contractors. As the Primary Corridor study advances into the Final Environmental Impact Study phase, the Department should require that a complete set of significant documents be maintained by the Department to protect the City's interests under this contract, to comply with federal contract requirements, and to facilitate future audits.

Finding Number Three:

Capital Projects Are Not Evaluated Upon Completion.

C There is no evaluation of capital projects after they are completed or become operational.

C Result: the effectiveness of the computerized traffic signals cannot be determined, and more articulated buses are being ordered despite serious problems being identified.

We found that except for individual phases of highway-related projects funded by the federal government, such as the Computerized Traffic Control System project, the Department does not evaluate a capital project when it is completed, nor does it evaluate the performance of the project when it is placed in operation. The issues regarding the particular projects reviewed follow.

Computerized Traffic Control System

For federal-aid highway-related projects, such as the Computerized Traffic Control System projects (CTCS), the State Department of Transportation requires the City to prepare a final report for each completed phase which includes a project description, project facts, actions, dates, personnel assigned to the project, a description of how the project evolved, itemization of key construction details and change orders, a project chronology, and a detailed display of project costs. Most important for this discussion is that it also includes a report on the contractor's performance and conclusions and recommendations.

These succinct reports provide useful information to anyone seeking an overview of the project phase and provide a means for the Department to learn from its experiences during its implementation of that phase. The feedback contained in such reports can also be used by the Department to continuously improve its management of capital projects.

However, with respect to CTCS, the reports are required by the State for each completed phase, not for the overall project. We found that the Department has no plan to monitor the performance, cost effectiveness, or results of the Computerized Traffic Control System as a whole. The last time the performance of the CTCS was evaluated was in 1992 during Phase I of the project, when a consultant estimated that the system had reduced travel time by 15 percent.² The Department does not have an effective procedure to ensure that the timing of each of the traffic signals connected to the system is optimal for current traffic conditions. Instead, the Department prioritizes its review of Oahu's intersections based on whether any public complaints are received.

The Department's current position regarding the lack of operational evaluations is that the CTCS projects are assumed to provide the necessary tools for a coordinated traffic system, that by installing such tools, an efficient and coordinated traffic system will be created, and that these projects should therefore be done.

We believe that evaluations are essential to protect the City's \$27 million investment made to date in the system. If the performance of the CTCS projects is not evaluated, the Department cannot measure the system's performance and identify any improvements, nor any

²We were told that the Department's copy of the consultant's report was discarded and is no longer available. A copy of this report was obtained from the Federal Highway Administration.

negative unanticipated impacts, that may result from the City's efforts. The actual performance of the system could depart significantly from the early test and the Department's good intentions, due to changes in traffic, changes in technology used, and other factors.

Bus Acquisition

(1) Selection of Manufacturer

The Department ordered articulated, low-floor, 60-foot buses for its inaugural express routes from a manufacturer the City had not used before. The Department proceeded with its order despite the knowledge that the Department's specifications limited the source of qualifying buses to only that manufacturer. Also, there were reports from other mainland jurisdictions that they had experienced serious defects in the buses of this manufacturer. Although the Department researched the track record of this and other manufacturers by phone prior to making the order, that research was not documented. Thus, there was no documented explanation of why the manufacturer was selected despite its poor reputation, nor why the Department moved ahead with specifications that permitted no choice of bus manufacturers.

(2) Manufacturing Defects

After the new buses were delivered to Honolulu, the City's bus mechanics cited numerous problems that had previously been identified by City inspectors while the buses were being assembled by the manufacturer. There were numerous examples of poor workmanship such as doors binding, sharp edges present throughout the passenger compartment, drive shafts installed incorrectly, and electrical wires and terminals left loose. The most serious problems were related to the air conditioning system, for which the manufacturer had substituted an untested hybrid system different from the one demonstrated to the Department and different from the

one the Department ordered. The failure-prone air conditioning system posed a health and safety issue to passengers because bus windows are sealed. The new buses could not be placed into service until the problems were resolved.

As another example, the City's bus mechanics inspecting the buses being assembled at the manufacturer's mainland plants pointed out to the manufacturer that the City's specifications called for stainless steel fasteners to be installed because of Hawaii's near-ocean climate. However, such fasteners were not installed by the manufacturer. Consequently, after the buses arrived in Honolulu, the exterior fasteners on the entire fleet of newly purchased articulated buses were found to be rusting and had to be replaced by the City's bus mechanics.

There were weeks of delays in getting manufacturing problems with the articulated buses fixed. The problems were so serious that the Department withheld approximately \$2 million in payments to the manufacturer on four buses to ensure that the manufacturer would resolve them. During the first three months after delivery, the City's bus mechanics worked 1,664 hours of overtime at the cost of \$53,000. Although the overtime cost was paid for by the manufacturer, the mechanics had to be diverted from their maintenance of the rest of the City's bus fleet. More recently, new problems have surfaced with the buses' engines dying on the road or accelerating poorly.

The problems with workmanship, failure to assemble the buses in accordance with the City's specifications, and poor performance of primary bus components should be addressed in an evaluation before ordering more articulated buses. That way, that subsequent contracts and procurement decisions can be structured to better safeguard the City's interests.

(3) Waiver of Prototype Bus Requirement

Entities wishing to purchase buses with federal funds must at least consider including in their purchase contract a provision requiring the manufacturer to produce a prototype bus. A prototype bus is a bus built by the manufacturer to the customer's specifications regarding type of engine, air conditioning, interior furnishings, signage, and other details. The prototype allows the manufacturer and customer to ensure that all specified components work together and provides a real-world example of the construction quality and operational performance to be achieved in the final product prior to putting a fleet into production. Changes on the production line are very difficult for the manufacturer to make because of documentation and engineering requirements and the lead time necessary to obtain parts. Transit authorities in Seattle and Houston that we contacted use the prototype bus requirement to their advantage.

We found that the Department waived its usual contract requirement that a prototype bus be constructed. The manufacturer requested the waiver because it claimed it would be more efficient to use the first bus off of the production line as the "prototype" bus.

The Department's waiver of the prototype bus requirement proved to be costly to the City in terms of delays in getting the new buses on the road and the diversion of bus mechanics to fix assembly problems that should have been the manufacturer's responsibility. The City received no discount or credit from the manufacturer in exchange for the waiver.

We believe the procurement of the articulated buses should be evaluated by the Department. That evaluation should address the Department's decision to waive the prototype bus requirement, its selection of a new manufacturer, and its selection of articulated buses. The lessons gained from the evaluation can then be applied to the procurement of new transit vehicles for the coming Bus Rapid Transit project.

(4) No Plan to Evaluate and Compare New Bus

The Department has not evaluated the actual operating and maintenance costs of its new buses and has no specific plans to do so prior to acquiring more articulated buses. Using most of a \$9 million appropriation for FY 2001, it is moving forward to acquire more articulated buses from the same manufacturer at roughly \$456,000 apiece, compared to \$289,000 for a standard bus. The Department has no plans to modify its bus acquisition specifications or acquisition contract to safeguard against the problems experienced in its first purchase of articulated low-floor buses.

If the Department were to collaborate with the bus operator, Oahu Transit Services (OTS), and conduct an evaluation of the initial procurement of articulated, low-floor buses, the Department could better assess the extent of the difficulties already experienced with the manufacturer and test the validity of its procurement decision. If the evaluation was positive and the Department decided to move ahead with additional bus purchases, it could then structure subsequent contracts and identify other solutions so that design and manufacturing problems are promptly addressed to the City's satisfaction before the buses are delivered to Honolulu.

The lack of documentation for any research on the pros and cons of procuring articulated buses from the manufacturer, the waiver of the prototype contract provision, and the lack of an evaluation of the initial procurement before proceeding with more acquisitions represent an expensive lesson on the merits of a documented evaluation of capital projects, including projects that consist of procurements of major equipment.

Finally, we note that the Department's staff complained about their inability to exclude contractors who perform poorly from bidding on future projects. We believe such

exclusions are possible under the procurement code, but only if the poor performance has been documented as part of an evaluation process for completed projects.

Recommendation:

We recommend that:

- C The Department consider implementing some form of written evaluation of its capital projects upon completion to gain the benefits of such evaluations. After capital projects are completed, the Department needs to also monitor and evaluate the operational effectiveness of those particular projects whose performance cannot be determined in advance.
- C The Department seek guidance from the Department of Budget and Fiscal Services regarding procurement methods that allow the quality of a contractor's past work to be used as a factor in contractor selection.
- C With respect to the Computerized Traffic Control System projects, the Department periodically evaluate the efficacy of CTCS projects in reducing traffic congestion at key intersections and during key periods, such as weekday rush hours. Such evaluations could be informative in designing later phases of the CTCS.
- C With respect to acquisitions of articulated buses or purchases from new bus manufacturers, the Department evaluate the acquisition process, bus specifications, contract provisions, and the performance of the new buses after they are placed in service before the decision is made to acquire additional buses from the same manufacturer.

Finding Number Four:

Project Status Reports to the Council Are Sometimes Not Issued and Are Not Meaningful.

C Two of the last four calendar year-end reports have not been issued. The information provided on project status is confusing, and key events are not being disclosed.

C Result: the Council is not receiving meaningful information about the progress of projects it funds.

The Government Finance Officers Association recommends the use of periodic status reports to aid management and the governing body in identifying and addressing problems with the implementation of capital projects before they become serious.³

In the City and County of Honolulu, the Administration's quarterly CIP status reports are the primary document for reporting the current activity on capital projects to the Council and the public. Among the items included in the report are fields to indicate percent of completion achieved and project status in each reported quarter.

We found that since fiscal year 1997, the reports for the quarters ending December 31, 1996 and ending December 31, 1999 have yet to be received by the Council as of this writing. The

³Tigue, Patricia, *Capital Improvement Programming*, Government Finance Officers Association, 1996, chapter 11.

December reports are the most critical of the quarters reported since that is when the capital budget appropriations for the previous fiscal year lapse and it can be determined whether projects funded that year move forward. We also found that when the Council does receive the reports, the reports are arriving later. The report for the quarter ending March 31, 1999 was received by the Council a month after the close of the quarter, but more recently the reports are arriving two and a half to three months after the close of the quarter.

We also found that the reports for the Computerized Traffic Control System and bus acquisition projects do not provide meaningful information, as described below.

Computerized Traffic Control System

In the quarterly CIP status report for the Computerized Traffic Control System (CTCS) project, the 1st Quarter 2000 (September 30, 1999) status of Phase IV was described as "Completed," the 2nd Quarter 2000 (December 31, 1999) status of that project was left blank, the 3rd Quarter 2000 (March 31, 2000) status was reported as "Construction Completed," and the 4th Quarter 2000 (June 30, 2000) status report stated "Project Completion." At best, this confused reporting prevents the Council from learning of the actual project completion date, which was May 31, 2000.

When we contacted the Federal Highway Administration and the State Department of Transportation to determine what information they had about the CTCS projects, we found that federal funding for future CTCS projects was halted until the City prepared an operations plan approved by FHWA (See Finding Number 5). That information was never included in the Administration's quarterly status reports on CTCS to the Council. That information was also not present in the Department's files. We believe such important project events should be disclosed in the Administration's CIP status reports.

Bus Acquisition

For the bus acquisition project, progress toward completion is based on the amount paid to date for **all** outstanding bus acquisitions. At the time of our review, there were three fiscal years' bus acquisitions in progress. As a result, it is impossible to determine the status of completion for each individual bus acquisition that may be outstanding at any time. More specifically, it is not possible to determine from the quarterly status reports the status of the acquisition of the articulated, low-floor buses because that year's acquisition was lumped together with the acquisition of standard buses. Further, the start and finish dates reported to the Council for bus acquisitions represent the start and finish dates of the manufacturer's production, rather than a date which would be more meaningful, such as the date the contractor was issued the notice to proceed or the date the City actually received the new buses.

Recommendation:

We recommend that:

- C The Department work with the Department of Budget and Fiscal Services to make its CIP quarterly status reports to the Council more informative, accurate, and reliable. The reports can and should disclose problems and issues that could lead to significant changes in budget, timetable, or project scope. For projects spanning several years such as bus acquisitions, it should separately report on the status of each procurement. A reasonable and consistent basis for reporting on a project's current progress as percent of completion should be adopted. The Department's entries for the existing status field should provide more meaningful information; in no case should the reported status of an ongoing project for any quarter be left blank.

- C The Department of Budget and Fiscal Services ensure that the CIP quarterly status reports are regularly issued and develop guidelines that would assist all departments in reporting project status consistently and meaningfully.
- C The Council enact an ordinance requiring quarterly reports on the status of the City's capital projects be submitted to the Council in a timely manner, such as within 45 days after the close of the quarter reported, and specifying the minimum amount of information to be included in the report.

Finding Number Five:

The Lack of an Approved Operations Plan for the Department's Computerized Traffic Control System Project Has Halted Federal Funding for the Project.

- C The Department has been unable to obtain federal approval for its operations plan.**
- C Result: federal funding for the system has been halted, but the Department is proceeding with a significantly scaled back facility for the project that risks cost overruns and may not meet program requirements.**

Despite being a federal requirement since 1984, the Department does not yet have a federally approved operations plan for its Computerized Traffic Control System (CTCS) program of projects. Different from an operating manual, an operations plan is a management document that addresses planning issues, performance requirements, coordination needs, training, and procurement aspects of the project. Without such a plan, there is no basis established for the approach the City has taken to develop its CTCS projects.

To remedy the Department's lack of a plan, two years ago, the Federal Highway Administration (FHWA) offered to provide funding to the City in order to develop an updated "Concept of Operations Plan". FHWA wanted the Department to use the funds to engage an expert on Intelligent Transportation Systems to assist the Department in preparing an operations plan for the City's Computerized Traffic Control System projects. In

October 2000, FHWA renewed its funding offer. At the time of our fieldwork, the Department had not yet taken advantage of this offer.

The Federal Highway Administration criticized the Department's February 1999 draft Traffic Control Center Operational Plan because it failed to identify specific indicators that would be used as measures of effectiveness. Such measures would enable the Department to determine if the Computerized Traffic Control System was meeting its operational goals. The Department's plan did not identify the baseline level of traffic congestion that the system was to alleviate, nor did it identify the level of improvement expected from implementing the system.

In April 2000, FHWA put all future federal highway funding for CTCS and another project, Traffic Signal Timing Optimization, Phase II,⁴ on hold until the Department prepares an operations plan that meets FHWA approval. In July 2000, the Department submitted its third draft of a proposed operations plan to FHWA. However, this plan was still unacceptable to FHWA and further changes are required to meet federal approval and restore federal funding eligibility for the City's projects. In August 2000, the Department requested that FHWA allow the Traffic Signal Timing Optimization, Phase II project to proceed as a demonstration project. FHWA agreed.

As of this writing, CTCS still lacks an approved operations plan. Without an operations plan, the City has no documentation on why the Computerized Traffic Control System projects have been implemented the way they have. There is no documentation on how CTCS is

intended to be developed in the future. There is no documentation on how such Intelligent Transportation System projects are intended to improve Oahu's traffic management in the future.

Issues That the Operations Plan Should Address

There are many questions that remain today relating to the goals of the CTCS and the approach taken to implement it. The operations plan should address the following:

- (1) **System goals.** What were the initial operational and performance goals of the Computerized Traffic Control System when the project began? What needs were to be addressed by CTCS? Have the goals been achieved? How will the Department measure its progress in achieving the goals, such as how much should the system be expected to reduce traffic congestion, if at all?
- (2) **System completion.** How many of the intersections on the island will be hooked up to the system? When will the system be completed and at what total cost? What are the staffing requirements to properly operate the system at present and what will the staffing be when the system is completed? Is the current practice of staffing the Traffic Control Center from 5 a.m. to 5 p.m. Monday to Friday sufficient to meet the City's current traffic needs? How much of the present equipment will require replacement and at what intervals in order to achieve the system's goals?
- (3) **System operation and maintenance.** How will the system respond to interruptions of traffic signal sequencing by an increasing number of vehicles carrying traffic signal modifying devices, such as ambulances, fire engines, and buses including the

⁴The Traffic Signal Timing Optimization, Phase II project is to test the impact on same direction and cross street traffic of devices installed in express buses that allow bus drivers to get an extended green light at selected intersections.

proposed Bus Rapid Transit system? How often should traffic signal timing at intersections be updated to meet current traffic conditions? Since traffic signal timing can be modified to facilitate traffic flow in only one direction at a time, how much of a disruption is acceptable to traffic in the opposite direction and to traffic in cross streets?

Phase VI Risks Cost Overruns and May Not Meet Program Requirements

The initial \$1,970,000 budget for Phase VI of the Computerized Traffic Control System project was composed of \$1,576,000 in FHWA funds and \$394,000 in City funds to: (1) construct a 2,500 square foot, single-story concrete building to house additional staff and equipment for CTCS for \$750,000; (2) improve system cables, detectors, and traffic signals for \$1,200,000; and (3) pay for State DOT plan review for \$20,000.

When FHWA halted further federal funding for Phase VI of CTCS, the Department proceeded with this project phase with only City funds and consequently reduced the scope of the project to construction of a building only. The Department awarded the contract for the building to a contractor and, within a month, reduced the scope of the building to lower its cost from \$750,000 to \$400,000. The amended scope for the building now provides for 1,600 square feet of area rather than 2,500 square feet, and wooden construction rather than concrete.

The Department's decision to proceed with Phase VI with the construction of a smaller than planned building without the improvement of traffic signals and cabling, and to move forward despite a reduction in total funding from \$1,970,000 to \$400,000, including the reduction in the building's budget from \$750,000 to \$400,000, raises questions about whether the amended project can still meet the requirements of the program, whether the project can be completed without costly change orders,

and whether it is prudent to proceed with the project without federal funding.

Recommendation:

We recommend that:

- C The Department consider accepting FHWA's offer to engage a consultant at FHWA's cost to expedite the completion of an approved operational plan for its program of Computerized Traffic Control System projects.
- C The Department reevaluate whether to proceed with the reconfigured Phase VI of the Computerized Traffic Control System project, or delay proceeding until a CTCS operations plan is approved and federal funding is restored.

Finding Number Six:

Budget Projections for Large Capital Projects Have Been Unreliable.

- C The Department has been unable to reasonably anticipate its budget needs.**
- C Result: this reflects poor budget planning and presents an obstacle to establishing a set schedule for routine bus replacement .**

In a well-planned capital program, a major capital project would be anticipated several years in advance of the date an amount is requested from the City Council, and as the year of actual appropriation draws nearer, the amount anticipated for the project should become more accurately defined and the scope of the project better understood.

We reviewed the amounts the Department included in the Executive Capital Program and Budget for fiscal years 1998, 1999, and 2000 for the bus acquisition, Computerized Traffic Control System, and Primary Corridor study. For each budgeted year, we reviewed the amount, if any, the Department anticipated being budgeted one, two, and three years in advance of the budgeted year. We also examined the amount shown for the projects in the Department's federally required Transportation Improvement Plan. Finally, we checked the amount budgeted to the projects that subsequently lapsed.

We found that there were wide variations in the amounts estimated in the budget documents for future project budgets. Therefore, the Department did not anticipate with reasonable accuracy the budget request actually presented to the Council.

Bus Acquisition

The budget amounts the Department projected for future bus acquisitions vary widely and in no set direction from the amount actually requested from the Council as the year of appropriation approaches. For example, the amount projected in 1994 for FY 1998 (i.e. three fiscal years forward) was \$300,000. In the next year, 1995, the amount projected for FY 1998 (i.e. two fiscal years forward) was drastically increased to \$22.6 million. In 1996, a year before the request for FY 1998 was presented to the Council, the amount was decreased by the Department to \$3.7 million. When 1997, the year for the Department to request funds for FY 1998, finally arrived, the amount actually requested from the Council was \$6.9 million. This amount was approved by the Council without change.

The bus acquisition budget for FY 1999 and 2000 also displayed wide swings in the amounts projected for future years, compared to the amounts requested.

The Department's 3-year Transportation Improvement Plan includes budget amounts for bus acquisition for the current year and projects the bus acquisitions for two years forward. However, the amounts included in the plan show the same wide swings with little relationship to the amount actually requested.

The Department attributed the variation in bus acquisition budget amounts to the uncertain availability of federal transit grants. However, the Department also told us that the federal formula funding has provided a consistent level of funding each year. In any case, the City has recently shifted its funding for bus acquisitions from federal grants to general obligation bonds. The budget variations are therefore due to the Department's inability to accurately plan its future budgeting needs.

Given the present uncertainty in budgeting for future bus acquisitions, the Department will have difficulty in

establishing and following a set schedule for routine bus replacement. It is important to have a reliable schedule for routine bus replacement to avoid the risk that major repairs and maintenance might be wasted on buses that the Department later decides will be replaced.

Computerized Traffic Control System

The amounts the Department projected to be needed in the future for the Computerized Traffic Control System have similarly been unreliable and inconsistent, and the Department has been unable to anticipate the budget requirements for this project even one year in advance of its request. For FY 2000, the amount actually requested, \$2,000,000, was half the \$4,000,000 the Department anticipated to be needed for that year just one year earlier.

In addition, the amount budgeted for CTCS has not been fully used. Over \$1.2 million of the \$4.5 million budgeted for CTCS for FY 1998 lapsed. For FY 1999, the entire amount budgeted by the Department and approved by the Council for the CTSC projects, \$100,000, lapsed.

Primary Corridor Transportation System Study

Funds were budgeted for the Primary Corridor study in FY 1999 and 2000. For both of those years, the Department did not anticipate needing the funding for the project in advance. Funding was only included in the Executive Capital Program and Budget for the project in the year an appropriation was requested of the Council.

Recommendation:

We recommend that the Department better utilize the City's six-year capital budget planning process and the federally required three-year Transportation Improvement Program process to identify more accurately the timing and amount of funding required for its major capital projects.

IV. Agency Response

In its second written response to this report, the Department of Transportation Services agreed with nearly all of the recommendations made in this report but disagreed with many of the findings. We have organized our comments by audit finding.

Finding Number One: the Department lacks official policies and procedures for managing its capital projects. The Department responded that it follows various federal, state, and departmental policies. We note that the policies the Department cited do not directly address project management.

Finding Number Two: the Department's project files were incomplete and noncompliant with federal, state, and its own document and retention requirements. The Department stated that it informed the auditors of separate project files and working files. We did not receive such information. Because of the limited and inconsistent documentation in the project files, we asked division administrators and project managers if there was any other project information available, such as status reports and correspondence. They repeatedly assured us that the project files were complete, and insisted there were no other locations where other project documents were stored.

The Department stated that copies of Form M-4, Request for Independent Services Contract, contained the justification for contract amendments. We found that the form serves as a signature document for approving contract amendments and lacks detail about the justification for contract modifications.

Finding Number Three: the Department does not evaluate its capital projects upon completion. The Department stated that the articulated bus manufacturer promptly

rectified all of the problems and that there was no impact on fleet maintenance or availability. We obtained correspondence and interviewed officials from Oahu Transit Services (OTS) that indicated otherwise. The Department disagreed that waiving its prototype bus requirement proved to be costly to the City. We maintain that the Department should use its contract provision requiring a prototype bus to ensure that bus manufacturers provide the City with quality vehicles consistent with the City's significant investment.

Finding Number Four: project status reports to Council are sometimes not issued and are not meaningful. The Department agreed.

Finding Number Five: the lack of an approved operations plan for the CTCS project has halted federal funding. The Department agreed.

Finding Number Six: budget projections have been unreliable. The Department stated that the number of buses procured may change due to the amount of funds appropriated by the Council. However, we note that for the years reviewed, the Council approved the amounts requested by the Department for bus acquisition without change.

Finally, the Department commented that it was favorably reviewed in the most recent Federal Transit Authority Triennial Review. We found that review to be an evaluation of compliance with federal regulations relating to such topics as use of minority contractors, "buy America," nondiscriminatory practices, and drug- and alcohol-free workplace policies. It was not an audit of the Department's management of capital projects. The Department also contended that the projects reviewed do not have a major impact on the bus rapid transit project.

We disagree. Procurement of new transit vehicles, transit planning, and the computerized traffic control system do have a major role in the proposed bus rapid transit project.